STATEMENT OF BASIS

PERMITTEE:	Shoshone Utility Organization
FACILITY:	Shoshone Utility Fort Washakie Membrane Filtration Water Treatment Plant
PERMIT NO:	WY-0044580
RESPONSIBLE PERSON:	Erin Martin, Director Office Phone (307) 332-3458 Water Treatment Plant Phone (307) 332-2077 E-mail: emartin@washakie
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CONTACT PERSON:	Erin Martin
PERMIT TYPE:	New Permit, Minor Industrial, Indian Country

Background Information

This statement of basis is for the new permit for the Shoshone Utility Organization's (SUO) new membrane filtration water treatment plant (WTP), which is located across the river from the SUO's older conventional filtration WTP. The new WTP is located in Fremont County, Wyoming on the Wind River Indian Reservation. It is approximately three miles due west of the Town of Fort Washakie and is in the SE ¼ of the NW ¼ of Section 1, Township 1 South, Range 2 West. The local address of the WTP is 21 Engavo Lane, Fort Washakie, WY.

The new WTP was completed in early 2008. Water is obtained from the South Fork of the Little Wind River via an infiltration gallery consisting of slotted pipes under the river. The water goes to the WTP by gravity flow via a 16" pipeline. Just prior to the intake pipe going into the WTP building, there is a provision for bypassing the water in the intake pipe to an old irrigation drainage ditch on the south side of the WTP property. This bypass can be used to drain the intake pipe for repairs, etc. The water treatment process consists of influent screens followed by membrane filtration using the Zenon Corporation's ZeeWeed® -1000 (ZW-1000) membrane filters. (Zenon Corporation may be part of GE Water & Process Technologies, General Electric Company.) Presently the WTP has two basins containing 6 Cassettes (three trains) of membrane filter units with provisions for adding four more Cassettes (2 trains) of membrane filter units in a third basin as needed. The present system is supposed to be able to produce a maximum of 3.0 million gallons of per day (MGD) of finished water. Chlorination and fluoridation of the treated water occurs following the membrane filtration. Finished water goes to a nearby storage tank with a capacity of about 2 million gallons. From there the water goes to other storage tanks and the distribution system.

Wastewater will be generated by (1) the routine backwashing of the membrane units with filtered water several times per day; (2) the daily treatment of the membrane units with backwashing solution

containing approximately 50 parts per million (ppm) of sodium hypochlorite; and (3) "recovery cleanings" using citric acid followed by neutralization with sodium hydroxide 6 times per year and cleaning with concentrated sodium hypochlorite solution (1,000 mg/L) followed by neutralization with sodium bisulfite about 12 times per year. It is estimated that about 8% of the water treated will go to "reject" flow. In order to produce 3 MGD of finished water, about 3.26 MGD will have to be treated, producing about 0.26 MGD of wastewater.

The wastewater from the water treatment process goes by gravity flow via a 20" pipe through Vault No. 1 to the backwash pond located near the WTP building. According to the plans, the backwash pond is rectangular in shape with curved corners. The inside dimensions at the bottom are 55' wide by 200' long. The sides have a slope of 3 horizontal to 1 vertical. The planned operating depth is 6.5'. This writer estimates the effective storage capacity, with no adjustment for accumulated solids, to be about 795,000 gallons. When producing about 0.26 MGD of wastewater per day, the theoretical detention time in the backwash pond would be about 3 days. There are provisions for adding a second backwash pond parallel to the first pond in the future. A decanter system is used to discharge water from the backwash pond. The intake end of the decanter system is designed to float on the surface and can be raised or lowered from/to the water surface by means of a cable system. Water from the surface of the backwash pond would flow into the decanter system and go to and through Vault No. 2 via an 8" pipe.

Inside Vault No.2 the piping is arranged so that the water may be directed to the outfall line (Outfall 001) or to the adjacent irrigation pump station. It should be noted that water is not released into the vault unless there is a leak in the piping. There are electronically controlled butterfly valves on the discharge pipe and the pipe to the irrigation pump station for use in controlling where water goes. On the discharge pipe there is a "mag" meter (magnetic flow meter) for measuring the discharge flow rate. The irrigation pump station is a manhole with a submersible pump for pumping water to a subsurface irrigation system for the landscaping at the WTP. The backwash pond has an overflow outlet at 7.5' above the bottom of the pond. The overflow is connected by pipe to the piping in Vault No. 2.

The permit application identified four points where water can be discharged from the WTP property. Two of the discharge outfalls need to be covered under the permit and two do not require a permit. These points where discharges may occur are discussed below.

The bypass of intake water before the intake pipe goes into the WTP building does not require permit coverage. No chemicals have been added to the water and the bypassed water is being returned to the same river from which it was obtained.

There is a 4" diameter drain line that goes from the south entrance to the WTP building to the unnamed irrigation drainage ditch. The drain line extends approximately 270' straight south from the WTP building, then approximately 580' in a southeasterly direction to the unnamed irrigation drainage ditch. The coordinates at the point of discharge are approximately 43° 00' 12" N and 108° 56' 45" W. The drain line receives storm water runoff from the south entrance to the building. Initially the indoor pipe trench within the water treatment plant building was connected to the 4" drain pipe. After the permit application was received, the permittee decided to change the piping so that any drainage from the indoor pipe trench goes to the backwash pond. The permit application was modified by means of a letter dated April 4, 2008. Permit coverage is not needed for the storm water runoff from the south entrance to the WTP building.

Outfall 001: This is the discharge from the backwash pond. When water is decanted from near the surface of the backwash pond or overflows via the overflow line, it flows into and through Vault No. 2 via 8" pipes. After the piping goes into Vault No. 2, it is either routed water through the vault to the outfall line or through the vault to the nearby irrigation pump station manhole. (Note: water is not released into Vault No. 2 unless there is a leak in the piping) The outfall line for Discharge 001is a 10" diameter DIP (ductile iron pipe) approximately 700' in length. This line goes in a southeasterly direction from Vault No. 2. The coordinates at the point of discharge are approximately 43° 00' 12" N and 108° 56' 37" W.

Outfall 002: This is a 3" PVC pipe that is connected to floor drains in Vault No. 1 and Vault No. 2. From Vault No. 1 the pipe goes by Vault No. 2, where the floor drain from that vault is connected into the pipe. From Vault No. 2 the 3" pipe is parallel to Outfall 001. The purpose of floor drains in the two vaults is to drain any water that may get into the vaults due to seepage, leakage during repair of the pipes going through the vaults, etc. It is anticipated that normally there will be no discharge from Outfall 002. This outfall was initially constructed to discharge directly into the irrigation drainage ditch. Subsequently, a pit was dug near the end of the 3" pipe. If water were to get into the vaults, it would flow into the pit. Depending on the volume of water going into the pit, there may or may not be a discharge into the unnamed irrigation ditch at approximately the same point as Outfall 001. It is anticipated that there will not be a discharge from the pit. The coordinates at the point of discharge are approximately 43° 00' 12" N and 108° 56' 37" W.

Receiving Waters:

The outfalls discharge to the unnamed irrigation drainage ditch located on the south side of the WTP. The drainage ditch flows into the South Fork of the Little Wind River (SFLWR) just upstream of where Shoyo Lane crosses the river. It is approximately 0.4 from Outfall 001 to the confluence with the river. Flow in the SFLWR is regulated by the Washakie Reservoir located approximately 8 stream miles upstream of where the discharge from the backwash ponds goes into the SFLWR. Water can be diverted from the North Fork of the Little Wind River (NFLWR) to the SFLWR via the North Fork Diversion Canal. It flows into the SFLWR approximately 2 miles upstream of where Shoyo Lane crosses the river. Flow can be diverted from the SFLWR approximately ¼ mile downstream of Shoyo Lane via the Ray Canal. The SFLWR merges with the NFLWR at the north edge of the City of Fort Washakie, approximately 3 ½ miles downstream of Shoyo Lane.

The USGS had two gaging stations on the SFLWR until June 1, 2007, when the stations were discontinued. Station No. 06228350 was located on the SFLWR about 1.9 miles upstream of Washakie Reservoir. The period of record for that station is from 10-01-1976 to 05-31-2007, with no flow data for 11-01-2005 through 04-26-2006. Station No. 06228450 was located 0.7 of a mile downstream from Washakie Reservoir. Its period of record is from 10-01 1988 to May 31, 2007, with no flow data for 11-01-2005 through 05-01-2006.

An examination of the streamflow data for the two gaging stations indicates that the reservoir is normally operated to have a minimum release of about 10 cfs. From October 1988 to September 2005 there were three periods of time when the flow below the reservoir was significantly less that 10 cfs. Those time periods are listed in the table below. In addition, the ranges of flows downstream and upstream of the reservoir for those time periods are given in the table. There were about four other periods lasting 1-2 weeks with flows in the range of 9.0 to 9.9 cfs.

Period	Range of Flows, cfs	
	Downstream	Upstream
10-28-1988 to 03-29-1989	4.1 to 9.4	8.0 to 21
03-15-1991 to 05-09-1991	3.5 to 6.5	18 to 44 a/
03-21-1992 to 04-27-1992	7.4 to 9.9	17 to 85

a/ From 3-15-1991 to 05-06-1991. On May 7, 8, & 9, 1991 the flows ranged from 64 to 244 cfs upstream of the reservoir.

Water Quality Considerations:

The Tribes are in the process of establishing water quality standards for the Wind River Indian Reservation, but they have not yet been approved by EPA. The proposed classification of the SFLWR from the confluence with the North Fork Little Wind River to the Tribal Wilderness Boundary is 2AB. That includes all tributaries and associated wetlands to this segment of the SFLWR. Class 2AB waters include cold water aquatic life, drinking water, primary and secondary contact recreation, wildlife, industry, agriculture and aesthetic uses.

The pollutants of potential water quality concern for the planned discharges from the new WTP are total residual chlorine (TRC), pH, and total suspended solids (TSS). The proposed water quality criteria for TRC for aquatic life are the same as EPA's recommend criteria (i.e. 19 ug/L for acute toxicity and 11 ug/L for chronic toxicity. The proposed criterion for pH is 6.5-9.0 for aquatic life and the effluent limitation on pH will be 6.5-9.0. There should not be a water quality problem due to TSS in the discharges if the usual technology based effluent limitation (e.g. 30 mg/L as a 30-day average) is met.

It is difficult to estimate the possible loss of chlorine that would occur from the point of discharge to the confluence with the SFLWR. During the summer in the daytime there could be a significant loss, with possibly no chlorine reaching the river. However, during the winter at night there may be very little loss of chlorine. In order to be protective of water quality, it is assumed that there will be no loss of chlorine from the time the discharge enters the irrigation drainage ditch until it reaches the river.

The rate of discharge from the backwash pond is another variable to consider. This writer was unable to make a reasonable estimate of the maximum potential rate of discharge from the backwash pond. Sheet C7 of the plans for the WTP shows the piping in the decant system to be 8" in diameter. The intake end of the pipe would be kept approximately 1' below the surface of the water in the backwash pond. Sheet G3 of the plans indicated that the outfall from Vault No. 2 is 10" DIP (ductile iron pipe) about 700 feet in length. The difference in elevation from the water surface in the backwash pond at the 6.5 operating depth to the end of the outfall line is about 11'. It could be assumed that if the discharge valve in Vault No. 2 was kept in the open position and the elevation of the decant system was kept relatively constant by mean of the cable system, then the amount of discharge over a 24 hour period should be approximately equal to the flow into the backwash pond during the 24 hour period. If the WTP was operating at the current design capacity of 3.0 MGD, the amount of wastewater produced would be about 0.26 MGD. That is equal to about 0.4 cfs. However, if the discharge from the backwash pond is done on a "batch basis", the rate of discharge may be significantly greater than 0.4 cfs at times, possibly in the range of 2-3 cfs. To minimize the potential

for an excessive amount of chlorine reaching the SFLWR, the effluent limitation on TRC for Outfall 001 is 0.10 mg/L (i.e. 100 ug/L). That is the lower detection limit in the analysis for TRC when using the DPD spectrophotometric method of analysis.

Effluent Limitations

Outfalls 001 and 002 have the same numerical effluent limitations, which are given below in the table. Currently there are no effluent limitations guidelines for discharges from water treatment plants. In addition, there are no other promulgated effluent limitations that apply to the discharge. In the absence of promulgated effluent limitations, the permit issuing authority may determine applicable effluent limitations based on "best professional judgement" (BPJ). This is in accordance with Section 402 (a)(1) of the Clean Water Act. The effluent limitations on total suspended solids (TSS) are based on BPJ. The detention time in the backwash pond should be adequate for the settling of suspended material in the wastewater going into the backwash pond. The decant system in the backwash pond will minimize the potential for settled solids being sucked into the effluent. Hopefully there will be no discharge from Outfall 002, but if there is, the detention time should be adequate to provide the necessary settling to meet the TSS limits.

As discussed in the above section on water quality considerations, the effluent limitations on TRC and pH are based on protecting the quality of the receiving waters.

Effluent Characteristic	Effluent Limitation		
	30-Day Average a/	7-Day Average a/	Daily Maximum a/
Total Suspended Solids, mg/L	30	N/A	60
Total Residual Chlorine, mg/L b/	N/A	N/A	0.10 b/
The pH of the discharge shall not be less than 6.5 nor greater than 9.0 at any time.			

a/ See Definitions, Part I.A. for definition of terms.

b/ For the purposes of the permit, the minimum limit of analytical reliability in the analysis for total residual chlorine is considered to be 0.10 mg/L. For purposes of this permit and calculating averages and reporting on the Discharge Monitoring Report form, analytical values less than 0.10 mg/L shall be considered zero.

Self-Monitoring Requirements:

The self-monitoring requirements are given in Part 1.3.2 of the permit. The requirements for Outfall 001, given in Part 1.3.2.1, are somewhat different from the requirements for Outfall 002, given in Part 1.3.2.2, because of differences in the two discharges.

The discharge from Outfall 001 can be controlled and there is the capability to measure the rate of discharge and the total volume of water discharged. A sample of the effluent being discharged can be pumped continuous to the laboratory in the WTP, making it easy to collect samples. Daily monitoring is required for TRC and pH as a means of providing protection water quality in the

receiving waters. Monitoring for TSS will be every two weeks, which should be adequate for the type and size of discharge involved.

Although no discharge is anticipated from Outfall 002, the permit requires that the outfall be visually inspected at least every two weeks to see if a discharge is occurring. If work is being done in either Vault No. 1 and/or Vault No. 2 that may result in a discharge, Outfall 002 is to be visually inspected daily to see if a discharge is occurring. Whenever a discharge is observed, daily sampling is to be done for TSS, pH, and TRC. Flow monitoring is not required because there is no flow measuring equipment at this outfall. The permittee is required to provide an estimate of the total volume of water discharged and the number of days the discharge occurred.

Reporting of self-monitoring results is to be quarterly. More frequent reporting is not considered necessary for this facility.

Inspection Requirements:

Part 1.3.3 of the permit requires that at least monthly the backwash pond(s) be checked for leakage through the dikes, animal burrows in the dikes, excessive erosion of the dikes, and the distance from the water surface in the backwash pond(s) and the invert of the overflow pipe. For both the backwash pond(s) and the pit for Outfall 002 the permittee is to check to see if there are any rooted plants, including weeds, growing in the backwash pond(s) and pit for Outfall 002. (Note: grass and low weeds growing on the banks of the dikes and in the pit for Outfall 002 is acceptable.) At least annually the backwash ponds are to be checked for the accumulation of sediment, with measurements being taken. Based on the measurements, the permittee is to make a determination as to whether or not sediment should be removed from the pond(s) before the next measurement is taken. A record is to be kept of all information obtained during inspections.

Miscellaneous:

The permit will be issued for a period of approximately five years, but not exceeding five years. The effective date and expiration dates of the permit will be determined at the time of issuance. The expiration date will be at the end of the calendar quarter closest to five years from the effective date without exceeding five years.

Permit drafted by Bob Shankland, SEE, Wastewater Unit, 8P-W-WW – April 7, 2008

Permit reviewed by Bruce Kent, EPA, Wastewater Unit, 8P-W-WW – April 7, 2008

Addendum

No comments were received. The permit will be issued as public noticed. The effective date will be June 11, 2008, and the expiration date will be March 31, 2013.

Robert D Shankland, SEE, 8P-W-WW
June 10, 2008.